UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

FOREST INSECT INVESTIGATIONS

THE IMPORTANCE OF RECENT BARKBEETLE OUTBREAKS IN TIMBER STANDS OF THE ROCKY MOUNTAIN REGION

By

J. A. Beal, Entomologist

Forest Insect Laboratory
Fort Collins, Colorado
March 7, 1938.

U. S. GOVERNMENT PRINTING OFFICE 60918

THE IMPORTANCE OF RECENT BARKBEETLE OUTBREAKS IN TIMBER STANDS OF THE ROCKY MOUNTAIN REGION

By

J. A. Beal, Entomologist

Forest Insect Laboratory
Fort Collins, Colorado
March 7, 1938

THE IMPORTANCE OF RECENT BARKBEETLE OUTBREAKS IN TIMBER STANDS OF THE ROCKY MOUNTAIN REGION

During the past two or three years the volume of timber lost in the Rocky Mountain region as a result of insect attack has been ten times greater than fire losses and even greater than the total volume of timber cut over the same period. In this connection it should be mentioned here that the receipts from timber sales on national forests in Region 2 were exceeded only by those from one other region during 1937. Of the huge losses by insects possibly 70 percent can be attributed to the work of the Black Hills beetle (Dendroctonus ponderosae Hopk.) in ponderosa pine, lodgepole pine, limber pine, and white bark pine. From the standpoint of the volume of timber killed the Douglas fir beetle (D. pseudotsugae Hopk.) working in Douglas fir ranks a poor second. Some of the other important tree-killing barkbeetles of the region are: the southwestern pine beetle (D. barberi Hopk.), the Engelmann spruce beetle (D. engelmanni Hopk.), the white fir beetle (Scolytus ventralis Lec.), the Oregon pine engraver beetle (Ips oregoni Eichh.), the balsam bark beetle (Dryocoetes confusus Sw.), and Scolytus unispinosus Lec. A few of the more important defoliators that

periodically are directly or indirectly responsible for the death of trees in the region are the spruce budworm (Cacoecia fumiferana Clems.), the pandora moth (Coloradia pandora Blake), the fir tussock moth (Hemerocampa pseudotsuga McD.), the great basin tent caterpillar (Malacosoma fragalis Stretch), and a pine sawfly (probably Neodiprion fulviceps). These are but a few of the long list of insects commonly destructive to trees in the Rocky Mountain region and while we know very little concerning the biology and habits of many of these insects we know still less about the amount of timber annually destroyed by them either in the aggregate or as individual species. The one case in exception is that of the Black Hills beetle on which some of these much needed data have been gathered during the past couple of years. Although the data on volume losses are admittedly incomplete they are included here as the best records available at the present time.

The importance of the Black Hills beetle as a tree killer can best be illustrated by a comparison of the volume of timber which it kills annually with the volume lost annually by fire, and the annual timber cut. These data are presented graphically by states at the end of this report and are listed in the following table:

Forest Depletion in the Rocky Mountain Region

State	Annual Fire Losses All Species[1]	Annual D. ponderosae Losses - Pine[2]	Annual Timber Cut - Pine[3]
Colorado	380,000 bd.ft.	15,000,000 bd. ft.	51,907,000 bd.ft.
Wyoming	11,723,000 " "	69,150,000 " "	35,706,000 " "
Utah	1,163,200 " "	7,500.000 " "	5,730,000 " "
Totals	13,266,200 bd.ft.	91,650,000 bd. ft.	93,343,000 bd.ft.

From these figures it will be seen that in Colorado annual losses in pine from the Black Hills beetle are nearly 40 times as great as are fire losses in all species and nearly a third as large as the cut of pine in the State. In Wyoming losses from this insect are over six times as much as are fire losses from all species and nearly twice as large as the annual cut of pine. In Utah these losses are nearly seven times as large as total fire losses and considerably larger than the total annual pine cut. When totaled for the three states the Black Hills beetle losses are nearly seven times as large as total fire losses in all species and almost equal to the total cut of pine. In all likelihood the indicated volume losses by the Black Hills beetle both in Colorado and Utah are far too low, for these figures are based only on the estimated volume of timber treated on control projects and on surveyed outbreaks and would probably be at least doubled if accurate surveys had been made throughout the entire region.

---

1. Annual fire losses taken from figures compiled for Extension Revision of Capper Report - 1934.
2. Annual D. ponderosae losses computed from known outbreaks 1935 to 1937 inclusive.
3. Annual timber cut taken from 1936 Census Report on Lumber Production.

Add to this loss figure in all states another 30 percent believed to represent the timber killed by other insects and our insect losses loom even more significant.

A good idea of the widespread nature of barkbeetle outbreaks in the Rocky Mountain region can be had by referring to the map at the end of this report. The data on the outbreaks and number of trees treated were taken from the records of 1936 since these are the latest complete data available. In many cases these outbreaks were decidedly worse during 1937. Most of the outbreaks were caused by the Black Hills beetle although a few were caused by the Douglas fir beetle and some by species of Ips. While each black dot on the map represents forests where treating was done or where infestations were known to occur, and the number of trees treated or estimated as infested is listed in the table attached to the map, these data most certainly do not represent all of the barkbeetle infestation in the region. There undoubtedly are scattered infestations on forest areas where no control work was done and there probably are many more concentrated infestations that because of inadequate surveys have not been discovered. Considering only those forest areas on which specific data are available we have nearly 30 separate areas where control work was done or infestations are known to occur*. Infested trees in these outbreaks number from 500 to 200,000 but omitting the two largest

---

* No figures are given for infestations occurring outside the territory covered by the Fort Collins laboratory although a few are indicated on the map.

outbreaks, the Shoshone Indian Reservation and the Elk Mountain area, they average over 7,000 infested trees each although quite a number have between 1,000 and 3,000 infested trees. Since nearly all of these are Black Hills beetle outbreaks it can readily be seen how very destructive this insect is.

Although it is definitely known that millions of board feet of Douglas fir have been killed in this region by the Douglas fir beetle during the past few years only in a few areas of high scenic value or high timber value has any attempt been made to control this insect and only on one forest in the region has a survey of the extent of damage been made. Probably less than 25 percent of the timber infested by the Douglas fir beetle has been treated in control projects.

Likewise, losses in Alpine fir have recently been very serious as a result of the work of the balsam bark beetle and but little heed has been paid this damage. Although Alpine fir has a low commercial value its scenic value and watershed protection values are high and therefore any insect killing it in large quantities should command more attention in the future.

Losses by the spruce budworm in Douglas fir have been serious in many localities throughout the region but thus far only limited attempts have been made to control it in the vicinity of summer homes and in scenic areas. Now a strain of this insect is threatening to become a serious pest of ponderosa pine and the extent to which this situation may develop is unknown. In any event more should be known

about this insect and its potential destructiveness to all species of timber.

At the present time a large outbreak of the pandora moth is building up over an extensive area of lodgepole pine in western Colorado and there is need for biological studies on this insect, for information on its importance as an enemy of lodgepole pine, and for surveys to determine the extent and severity of its outbreaks.

The aforementioned insects together with a number of other destructive forest insects are annually taking a heavy toll from our forest resources. It is therefore high time that the extent of these losses be fully appreciated by forest protectionists so that measures of detection and control can be made sufficiently intensive to cope with the situation.

With regard to fire losses credit should be given the U. S. Forest Service, the National Park Service, the Indian Service, and other forest protection agencies for keeping them at a minimum. This is accomplished through the organization of adequate fire detection and fire suppression systems. The danger from fires having been fully realized appropriations have been made available not only for controlling them but for preventing them in so far as is humanly possible. The aim of all efficient fire fighting organizations is to detect them and stop them while they are small. To be effective insect control should be organized on the same intensive basis as fire control, but because of inadequate funds it is not possible at present to give

forest insect outbreaks the same attention as received by fires although as demonstrated they may prove to be considerably more destructive.

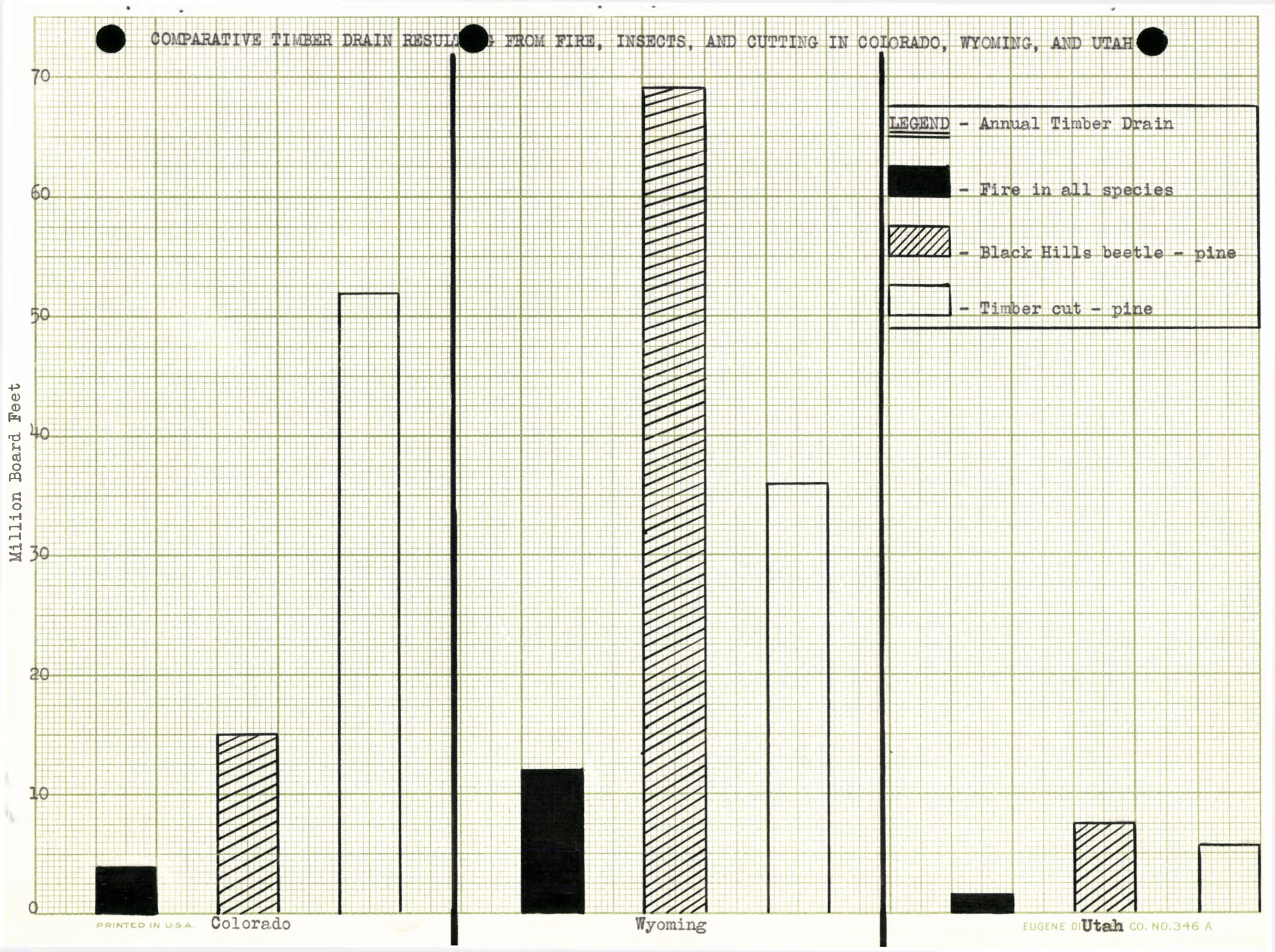
Our detection system or insect surveys are undoubtedly the weakest phase of forest protection work. At the present time we have so little survey money that it has to be used chiefly on areas where infestations have already reached alarming proportions. None is left for surveys of doubtful, endemic, or high hazard type areas and it is therefore in just such areas that epidemics build up and become serious before we are aware of them. An annual expenditure of ten thousand dollars for insect surveys in the Rocky Mountain region and the addition of one permanent man to head up this work would save many thousands of dollars yearly in insect control expenditures. With this set-up it would be possible to locate incipient outbreaks and control them while they are small instead of having to wait until a lot of timber has been killed and then tackling extensive outbreaks where the cost of control has mounted several hundred-fold.

Respectfully submitted,

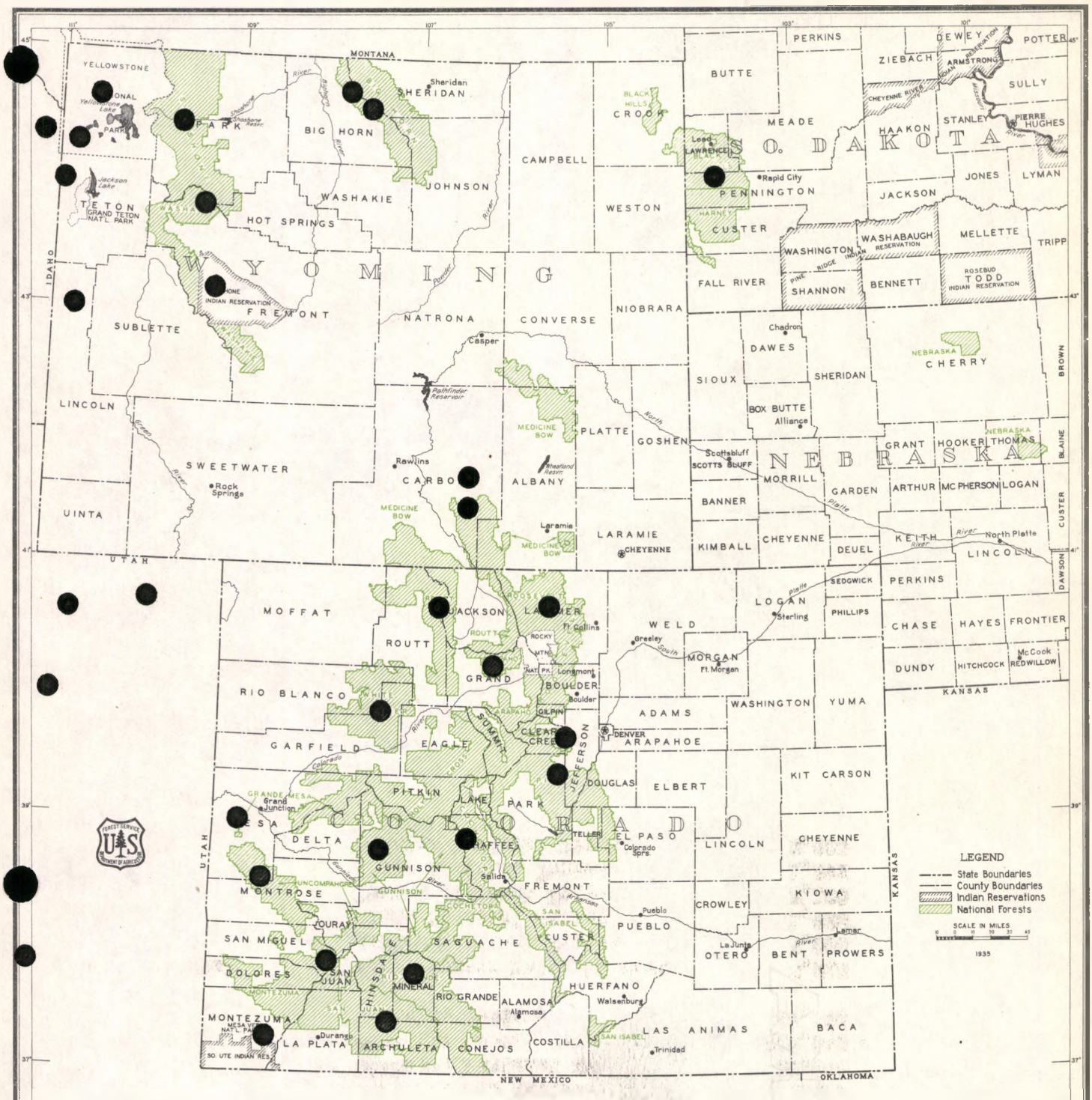
J. A. Beal

J. A. Beal, Entomologist.

cc-Dr. Craighead-2
Miller
Evenden
Keen


COMPARATIVE TIMBER DRAIN RESULTING FROM FIRE, INSECTS, AND CUTTING IN COLORADO, WYOMING, AND UTAH
Million Board Feet
70
60
50
40
30
20
10
0
LEGEND - Annual Timber Drain
- Fire in all species
- Black Hills beetle - pine
- Timber cut - pine
Colorado
Wyoming
Utah
PRINTED IN U.S.A.
EUGENE DIETZGEN CO. NO. 346 A

BARKBEETLE INFESTATIONS - 1936



U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

ROCKY MT. REGION

BARKBEETLE INFESTATIONS YEAR OF 1936

	Area	Infested Trees
Colorado -	Arapaho National Forest	1,500
	Colorado National Monument	1,000
	Cochetopa National Forest	2,772
	Denver Parks area	4,000
	Gunnison National Forest	721
	Mesa Verde National Park	1,200
	Montezuma National Forest	1,700
	Pike National Forest	6,000
	Rocky Mountain National Park	1,000
	Roosevelt National Forest	15,000
	Routt National Forest	438
	Rio Grande National Forest	879
	San Juan National Forest	948
	White River National Forest	735
	Uncompahgre National Forest	413
Wyoming -	Bighorn National Forest	11,500
	Elk Mountain	150,000
	Medicine Bow National Forest	4,476
	Shoshone National Forest	35,000
	Shoshone Indian Reservation	200,000
	Washakie National Forest	80,000
Utah -	Bryce Canyon National Park	3,215
	Ashley National Forest	7,000
	Dixie National Forest	1,828
	Powell National Forest	2,180
	Uinta National Forest	1,592
	Wasatch National Forest	2,000